# Observations of Venus in Stone Age Europe

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**Abstract: A cave wall pictograph in Spain, drawn probably in the early Neolithic period, is identified as a timed record of an evening apparition of Venus.**

**Preface. The following paper, written in late 1988, resulted from a surprise discovery by me in the course of research on the Venus lore of the Dogon of Mali, wherein the sharp rays of the brightest "moving star" are significant. Some years earlier I had made intensive observations of the ray patterns of bright stars produced by my own eyes, finding them remarkably similar to those in scores of pictographs by ancient and by living "primitive" peoples. In some cases I could estimate the visual magnitude of the star represented from the pattern diameter relative to the central spot and from the number of rays, to the nearest half-magnitude or so. For example, the ancient Egyptian five-rayed star, though generally stylized, depicts the average appearance of the brightest ten or 12 known fixed stars. And the famous Chaco Canyon picture of the Crab supernova was seen by the artist-observer at about mag.-4.0, evidently the brightest it became, explaining why Chinese observers could see it in daytime for less than a month.**

**I hardly expected to find such star pictures among the scanty astronomical art of prehistoric peoples, considering for example that even the Moon is rarely represented and never very realistically. Thus I was astonished to see a reproduction, in a book by Gerald Hawkins, of two clearly related, multirayed stars he discovered in a cave in southern Spain. My interpretation is presented below. It was submitted to the British journal Nature and rejected as "speculative" and "not competitive," buzzwords for Not Invented Here--the same response an obscure, retired engineer named C.P. Newham got about 35 years ago to his discovery of significant astronomical alignments in Stonehenge, which were rediscovered by and credited to the properly credentialed Hawkins a few years later. Rather than endure the same crap from another journal--I had had enough already from Archaeoastronomy--I simply waited for an opportunity to freely publish. And it has come sooner than I expected. You the reader are just as free to accept or reject this work, but at least you get to see it.**

**P.C.S., 9/11/96**

**Archaeoastronomy has discovered little about remote prehistoric astronomical knowledge, according to reviews by Hawkins(1) and Krupp(2): the Moon's phase period, definition of geographic directions by sunrises and sunsets, and the correlation of the noon Sun's altitude with season. Terminal achievements headed by Stonehenge and the Egyptian 365-day annual calendar are credited to a contemporary knowledge boom rather than to gradual accumulation.**

**These assessments actually reveal intellectual stagnation of the interdiscipline from research biases and skill deficiencies, including monument alignment mania (Aveni (3)), insensitivity to archaic astronomical art due to inexperience with specimens elucidated by writing or oral tradition, and above all, unfamiliarity with important naked eye phenomena due to a lack of personal observing experience, forcing dependence on poor textbook descriptions. Substantially more Stone Age knowledge existed than is presently admitted. In particular, Venus was carefully observed by Neolithic Europeans, as ironically shown in Hawkins' conservative review.**

**The naked-eye observer with emmetropic (20/20 ft) vision sees very bright stars well up in dark skies as brilliant points from which luminous rays of differing brightness emanate. The ray pattern is invariant but seems different in the dimmer than the brighter objects as easily visible rays decrease from 10-12 in Venus (magnitude -4) to seven in Sirius (-1.5) and five at zero mag. (e.g. Procyon, Vega). Total ray illuminance is about ten percent of the central spot's, judging from individual ray invisibility in third mag. and dimmer stars. The brightest stars exhibit rays even in twilight, though fewer than at night. Venus shows 5-6 in bright-medium twilight. The richest dark-sky patterns reveal axisymmetry in the horizontal and vertical meridians and partial symmetry in the diagonals. Contrary to published claims, e.g. by Minnaert(4), nearly the same pattern is seen by all emmetropes in good physical condition, except possibly very young and very old people, though this important result is obscured by differing observation and drawing ability. The evidence is too lengthy to discuss here. The ray tips define a rough circle of angular diameter approximately 12 arc-minutes for mag. 1.0 stars to 30 for-1.5 and one degree at -4.5 (20 degrees altitude), from comparisons with known star separations and near-field scales. There is a slight dependence on star color. The diameters are very sensitive to sky luminance and can fall to half the ideal values in twilight or moderate moonlight. Venus' pattern in bright-medium twilight is 15-20 arc-min across.**

**The rays are image aberrations due to anatomically normal, cylindrical micro-deformations of the corneas in the horizontal and vertical meridians, produced by the eyeball suspension and complicated by gravity. So-called "night myopia" (nearsightedness)(5) causes the resulting line images to appear sharply focused. Details are beyond the scope of this paper. Imperfect vision correction by eyeglasses and poor seating on the head can alter the natural ray pattern.**

**Rayed stars were common knowledge to ancient peoples, who evidently believed the rays were natural appendages, and inspired traditional symbols, some realistic (Figure 1a;(6)), others modified to accommodate numerology (Fig. 1b;(7)). The rays play an important role in the astronomical lore of some living "primitive" peoples (Figs. 1c,d;(8,9)).**

**An especially fine, realistic representation of an extremely bright star, independently identified from Far Eastern written records, occurs in the Chaco Canyon, New Mexico pictograph of the Crab supernova in conjunction with a crescent Moon in the morning of July 5, 1054, reproduced from Cornell(10) in Fig. 2a.**

**Either ignorant of the ray phenomenon or believing the rays to be illusory or artists' fabrications, modern astronomers generally dismiss such pictures as scientifically worthless(11). In fact, without supporting documentation, the Chaco Canyon pictograph would be the principal evidence for the SN and crucial to associating it with the Crab Nebula and embedded pulsar. Fig. 2b compares the star picture with a**

**drawing of Venus by me as viewed near dusk in December 1981, when the planet was at mag. -4.7 and altitude 20 deg. The patterns are very similar. Eight of the ten rays in the former appear as singles in the latter and the other two, denoted 1 and 8, appear as multiples. Only one single, 4, is oriented more than 15 deg differently. Notice also its curvature in Venus. Somewhat greater brightness of Venus can account in part for its multiple rays, but most of the differences from the presumed SN are very likely spurious products of the eyeglasses I was wearing and perhaps some simplification by the Chaco Canyon observer-artist. His picture represents a star of mag. near -4.0. Supporting this estimate is the central spot diameter relative to the average ray length--double that in the Venus drawing, implying that the SN's rays actually appeared shorter. Allowing for some spot size enlargement in both pictures to represent great brightness, this comparison suggests a view of the SN at about 15 deg alt. in early twilight, or lower near dawn, reducing its ray pattern diameter to about 0.5 deg. See Fig. 1d for another representation of Venus, with very short rays and exaggerated central spot indicating bare visibility.**

**While researching ancient knowledge of Venus for an article on the Venus calendar of the Dogon of Mali, I noticed a pictograph that Hawkins had found on a cave wall near La Pileta in southern Spain(12), which is reproduced from his book rotated 45 deg counter-clockwise in Fig. 3a. He states that the rayed symbols were carefully drawn, then calls them "possibly suns," a contradiction since nobody ever has made a realistic picture of the Sun's multitude of rays. The ray pattern in the lower symbol is almost identical to those I just discussed; see Fig. 3b. Nine of ten rays in the SN picture appear in the La Pileta one and seven (1;4-8;10) have orientations agreeing to 15 deg or better. The lower of the two extras in the upper left quadrant of the latter is almost certainly a drawing flaw--part of ray 3. Seven of ten single rays (3-7; 9,10) and both multiples in my Venus drawing (Fig. 2b) appear in the La Pileta symbol though the directions differ somewhat more than in the first comparison. Notice also the similar central spot and circle diameters in the SN and L.P. pictures, respectively, relative to their ray lengths, implying that the latter shows a very bright star in twilight, at low altitude, or both. All these considerations make Venus the prime candidate as the source.**

**Despite its distorted appearance, probably due in part to natural damage, the upper rayed symbol in Fig. 3a is so stylistically like the lower one that it must represent the same object. Also, its rays are longer, implying somewhat greater brightness. It is most likely a representation of Venus at a higher altitude--perhaps 25 deg--near dusk compared with about 10 deg for the lower symbol. That the two evidently depict objects not greatly different in brightness is a strong argument against the source having been a bright nova or supernova, for which we would expect to find a representation when dim as well as when bright.**

**Furthermore, the two adjacent "comb" or "rake" symbols, which are counts discussed at length by Hawkins(13), are aligned roughly with the star symbol pair. I believe they record the elapsed time between the two Venus stations (right "comb") and the duration of the upper one (upper left "comb"), in approximate lunar months, from successive first-visible evening or last morning crescents, or from successive Moon-Venus conjunctions. Thus the intervals shown are two and three months respectively. An additional month may have elapsed between abandonment of counting on the right-hand symbol and starting on the left-handed one (see below). So the total observation period was five or six months, an improbably long one for a nova or supernova to remain near maximum brightness.**

**At the latitude of La Pileta, 37 deg N, in all evening or morning apparitions of Venus**

with a three or four month-long high station corresponding to 36-48 deg solar elongation, the transition to or from inferior conjunction with the Sun is rapid, whereas that from or to superior conjunction lasts about four months, the planet appearing at low altitudes when most conspicuous for most of that period. Therefore the lower symbol in Fig. 3a most likely represents an early post or late pre-superior conjunction view. And its better condition suggests that it was drawn first, on a better patch of the cave wall than the upper symbol, favoring the post-conjunction or evening alternative. The overextended baseline of the 3-symbol is consistent: The 'flaw', the most extreme in any of Hawkins' count-symbols, appears deliberate, in anticipation of adding another month-mark. But by then Venus had reached an altitude standstill, so the observer-artist decided to begin a new count figure to record that phenomenon, probably losing a month in the total apparition timing. Figure 4 summarizes these interpretations, which best fit an evening apparition that began in mid-autumn and ended the following late spring, as in 1987-88.

Hawkins gives no age for the La Pileta pictograph, but the count symbols seem evolved from the groove rows carved on bony material by Europeans until ca. 15,000 years ago. The 15-10 millenia-old Gontzi, U.S.S.R., mammoth bone's carved pattern appears prototypical of the new style(14). The drawn symbols in remote Spain are probably more recent, 10,000 years old to 7,000--when the latest well-dated cave art was executed in this region. This period is 2,000 to 5,000 years earlier than any presently recognized, definite evidence for careful observation of Venus(15). Repetition of those inferred from Fig. 3a for a series of successive evening and morning apparitions would have revealed the 19-month synodic period, and the eight-year apparition recurrence period was discoverable in a Neolithic European's adult lifetime.

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